

C O M M U N I T Y N E W S**Clemson professors kick off NASA-JSC Engineering Seminar series**

Two professors from Clemson University were the featured speakers as the NASA-JSC Engineering Seminar series kicked off August 11 in the Bldg. 30 auditorium. Clemson University will also be the site of the 8th EVA forum sponsored by the EVA Directorate/XA on November 9 and 10, 1999.

Dr. Larry Dooley, professor, chair of the Bioengineering Department, and director of the School of Chemical and Materials Engineering, and Dr. Christine Jarvis, J. E. Sirrine professor of textiles and director of Clemson Apparel Research, presented a joint seminar at the invitation of NASA.

Dr. Dooley presented an overview on fiber and materials research conducted within The Center for Advanced Engineering Fibers and Films (CAEFF) at Clemson University. CAEFF is a National Science Foundation Engineering Research Center, a partnership between Clemson and the Massachusetts Institute of Technology as well as more than 10 major corporate partners. The center provides an integrated research and education environment for the systems-oriented study of fibers and films, such as those used in EVA suits and pressure suits. The center depends on a solid science base leading to methods which couple molecular and continuum modeling. Combined with virtual reality teaching aids and rapid prototyping, the center allows the rapid and efficient development of new products and processes.

Dr. Jarvis discussed the Clemson Apparel Research Center with emphasis on Department of Defense-supported research for advanced manufacturing methods of specialized clothing, as well as anthropometric measuring techniques (such as laser scanning) and related research. The center is closely coupled with the School of Textiles, Fiber, and Polymer Science which has worked in these areas for "instruction, research and service" for more than 100 years.

"The primary focus of what we are doing in our center is to create a new paradigm," said Dooley. "Our thinking is that we need to create the fundamental science base for fiber and film work, combine that with experimental data through

Center research is expected to revolutionize the production of fibers and films, which could generate more than \$200 billion in revenue industry-wide. The center is the only one in the nation to deal exclusively with fibers and films, an industry

A full-fledged research and production facility, the Clemson Apparel Research center is not a typical academic department. "Clemson Apparel Research reports to the chief research officer of the university. It is not an academic department. We have no tenure-track faculty," said Jarvis.

Major objectives of Clemson Apparel Research include operating a model apparel plant using state-of-the-art manufacturing technology and innovative management techniques, assisting apparel manufacturers on the use of nontraditional capital investment criteria in the purchase justification of advanced manufacturing technology, and working with other U.S. universities and industries to provide assistance to the Department of Defense and military contractors.

Clemson Apparel Research projects include redesigning the patterns for Navy men's clothing and Air Force women's flight suits. Since 1993 the center has produced more than 7,000 special measurement shirts for Army men and women, Air Force women, and Marine Corps women.

Engineering seminars will be periodically sponsored by JSC to provide employees not only with information related to advancements in their own fields, but also to introduce them to research and developments in new areas which could have unexpected impacts on existing projects. Suggestions for speakers and topics should be directed either to the Assistant Director, University Research and Affairs, Dr. Bonnie Dunbar, or to the Engineering Directorate, Donna Mays. For more information on the seminars contact Stephen Wiggins (x33078) in JSC's Human Resources Development Branch. ■

For information on the upcoming 8th EVA forum contact Tony Bruins (anthony.c.bruins1@jsc.nasa.gov) or Dr. Dooley (dooley@clemson.edu).



Dr. Christine Jarvis and Dr. Larry Dooley were the featured speakers for NASA JSC's Engineering Seminar series. Jarvis and Dooley, center, are shown above with Astronaut Timothy J. Creamer, left, and JSC Assistant Director, University Research and Affairs, Dr. Bonnie Dunbar, right.

JSC Photo S99-09064 by James Blair

mathematical models, and then take advantage of the advances that we realize in the computational sciences and engineering."

According to Dooley, the fiber and film industry is characterized by demand for efficiency, customer-specific products, and low manufacturing costs due to the use of fully automated plants. He sees the demand for specialty fibers and films growing by 50 percent by 2008.

Dooley sees opportunities, for example, for forming low-cost polymers such as nylon into fibers with Kevlar-like properties and being able to fabricate lasers 4 mm in diameter from electrically conducted polymers. "We see these types of applications for new fibers and films if we have the technology to understand the structure/property relationships to be able to develop the material."

that accounts for 25 percent of the manufacturing segment of the U.S. gross domestic product and is the dominant industry in the South. The industry's manufacturing base includes electronic components, fiber optic cables, synthetic fibers, multi-layer food-packaging films, and reinforced composites used in construction and aircraft. Products to be affected – in some cases, reinvented – as a result of Clemson research can be found in fields as diverse as biomedicine, transportation, communication and construction.

The Center for Advanced Engineering Fibers and Films works with facilities at other national centers and industrial laboratories including NASA's John H. Glenn Research Center at Lewis Field in Cleveland, Ohio.

NASA shares joys of space flight with air show enthusiasts

Seven NASA centers, including JSC, joined together to share the excitement of space flight and technology with the more than 765,000 attendees at the Experimental Aircraft Association (EAA) AirVenture Oshkosh, held July 28 – August 3 in Oshkosh.

AirVenture's campus of more than 1,200 acres at Wittman Regional Airport, showcased more than 2,200 competition aircraft, 700 aviation exhibits and 500 forums, workshops and seminars to highlight its 47th anniversary. NASA aircraft, displays and interactive simulators and tours peppered the airshow site.

"It's vital to have NASA here at EAA AirVenture," said Dick Knapinski, EAA spokesman. "They are on the forefront of the technology that will take aviation into the next century."

The event's high attendance included more than 2,300 international guests from 77 nations, providing an impressive venue for sharing information on the increasingly global nature of the space program and the International Space Station already in progress.

"People are getting a renewed interest in space," said Louis Parker, JSC Exhibits manager. "And things that NASA can do, like this, help to raise awareness of advances in the space program. It sparks a dialogue with people that fuels the interest in our country's space program."

In addition to representatives and exhibits from JSC,

Glenn Research Center, Marshall Space Flight Center, Langley Research Center, Lewis Research Center, Ames Research Center, and NASA Headquarters also participated in the event.

NASA Administrator Dan Goldin received EAA's Freedom of Flight Award during the event for his support of aviation and noted how AirVenture participants are on the leading edge of aviation development.

"It was very exciting to see the innovation as I visited engine and airframe manufacturers here," Goldin said. "They're pretty bullish. ...Seeing this, it's easy to be optimistic for aviation's future."

NASA exhibits filled two buildings and a portion of the EAA Pavilion. Included in NASA's displays was the Airborne Research Integrated Experiments System (ARIES), a technology-loaded Boeing 757 flying lab. The aircraft, operated by NASA's Langley Research Center, incorporates computerized mapping system technology and can execute automated landing trials using the Global Positioning System.

NASA's interactive displays included a walk-through mockup ISS module with prototype microgravity racks; the Ascent/Entry Trainer, a desktop simulator used to supplement astronaut training; a hands-on "Dock the Shuttle" simulator; and a "Tour the Space Station" kiosk. A cutaway spacesuit was set up for visitor photo opportunities as well.

Astronauts Linda Godwin, Greg Harbrough, Scott Horowitz, Steve Nagel, Charlie Precourt, and Stephen Robinson also were on hand for daily presentations on the space program and autograph signings.

"NASA's exhibits were a pretty big hit," added Parker. "The crowds that attend AirVenture are interested in space – but the things we've done in the past year, with John Glenn and Eileen Collins, have really peaked their interest. JSC's support of the event this year was just icing on the cake for what NASA was already doing."

More than 10,000 airplanes, representing all types, sizes and eras, were flown to the Oshkosh area to attend the annual celebration of flight. In addition to a flyover from the U.S. Air Force Thunderbirds demonstration team, enthusiasts were witness to various aerial acts, including a competition which featured six of the world's best air show pilots – Sean D. Tucker, Gene Soucy, Matt Chapman, Mike Goulian, Ian Groom and Rocky Hill.

Show visitors also were treated to a collection of rare aircraft on display, including such one-of-a-kind aircraft as the Sikorsky S-38 amphibian replica, Kruetzler K-5 tri-motor and Boeing 247D transport, among others. The Proteus, an all-composite canard aircraft designed for high-altitude missions, including telecommunications and atmospheric studies, also was on display. ■